

Course Code: B20AD0E03					
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					R20
III B.Tech. II Semester MODEL QUESTION PAPER					
DATA ANALYSIS USING R (Open Elective-II)					
(For CE, ECE, EEE & ME)					
Time: 3 Hrs.			Max. Marks: 70 M		
Answer ONE Question from EACH UNIT					
All questions carry equal marks					
Assume suitable data if necessary					
			CO	KL	M
UNIT-I					
1.		Discuss Application of Data Analytics.	1	2	14
OR					
2.		Discuss classification and characteristics of Data.	1	2	14
UNIT-II					
3.	a).	Explain various data types in R with example.	2	2	7
	b).	Explain with example how to use inbuilt functions and how to create user defined function in R.	2	2	7
OR					
4.		Discuss various control statements in R programming with examples	2	2	14
UNIT-III					
5.	a).	How to read csv file in R? Explain with example. How to print the summary of read csv file.	3	3	7
	b).	Discuss the need of dplyr packages with examples	3	3	7
OR					
6.	a).	Explain with example how to connect R with database and fetch all records from a table and display it in R.	3	3	7
	b).	Discuss the need of tidyr packages with examples	3	3	7
UNIT-IV					
7.	a).	What is difference between Bar charts and histograms? Explain with example how to draw bar chart and histogram in R	4	3	14
OR					
8.	a).	Discuss different graphical analysis tools for analyzing data.	4	3	14
UNIT-V					
9.	a).	Discuss binomial distribution with example and R commands	5	3	7
	b).	Differentiate Random Forest and Decision Tree? Explain with example how it works in R.	5	3	7
OR					
10.	a).	Discuss Survival Analysis. Explain with example as how Survival analysis is done in R.	5	3	7
	b).	Explain linear and multiple regression function with example.	5	3	7

CO-COURSE OUTCOME

KL-KNOWLEDGE LEVEL

M-MARKS

NOTE : Questions can be given as A,B splits or as a single Question for 14 marks

Course Code: B20CEOEO3					
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					R20
III B.Tech. II Semester MODEL QUESTION PAPER					
INTELLIGENT TRANSPORT SYSTEM (Open Elective-II)					
(For AIDS, CSBS, CSE, ECE, EEE, IT & ME)					
Time: 3 Hrs.			Max. Marks: 70 M		
Answer ONE Question from EACH UNIT					
All questions carry equal marks					
Assume suitable data if necessary					
			CO	KL	M
UNIT – I					
1.	(a)	Define ITS? What are its roles and responsibilities in the field of transportation?	1	2	7
	(b)	What is ATIS functionality and its role in transportation system?	1	2	7
OR					
2.		Discuss the importance of smart route systems briefly and explain its benefits.	1	2	14
UNIT – II					
3.	(a)	What is ATMS? List the objectives and uses of ATMS?	2	3	7
	(b)	What are various strategies employed in ATMS?	2	3	7
OR					
4.		Explain in detail about congestion pricing with examples.	2	3	14
UNIT – III					
5.	(a)	Describe various types of APTS? Discuss the use of APTS in real time traffic analysis.	3	3	7
	(b)	How does 'ITS' improves the efficiency and safety of Commercial Vehicle Operations?	3	3	7
OR					
6.	(a)	What are the goals of Automated Highway System (AHS).	3	3	7
	(b)	What are the objectives and benefits of Electronic Toll Collection?	3	3	7
UNIT – IV					
7.	(a)	Explain the organizational and institutional issues involved in ITS?	4	4	7
	(b)	Explain about Regionally - Scaled ITS deployment.	4	4	7
OR					
8.		Explain the working of ITS in developed and developing countries.	4	4	14

UNIT – V					
9.	(a)	What are the critical issues in ITS. Suggest suitable measures to control them.	5	4	7
	(b)	Explain various issues involved in R & D policy. Explain briefly.	5	3	7
OR					
10.	(a)	Describe various conclusions which are needed to develop future ITS?	5	4	7
	(b)	What are the major emerging issues in ITS?	5	3	7
CO-COURSE OUTCOME		KL-KNOWLEDGE LEVEL	M-MARKS		

NOTE : Questions can be given as A,B splits or as a single Question for 14 marks



Course Code: B20CEOE04					
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					R20
III B.Tech. II Semester MODEL QUESTION PAPER					
BUILDING SERVICES (Open Elective-II)					
(For AIDS, CSBS, CSE, ECE, EEE, IT & ME)					
Time: 3 Hrs.			Max. Marks: 70 M		
Answer ONE Question from EACH UNIT					
All questions carry equal marks					
Assume suitable data if necessary					
			CO	KL	M
UNIT-I					
1.	a)	Classify Buildings based on functional use. Explain the role of building services in reaching the full functionality of buildings. What kind of building are you writing your exam right now?	1	2	7
	b)	What are the different types of escalators? Describe the components and discuss the area calculations for installing such a system.	1	2	7
OR					
2.	a)	Discuss the idea of an FTE (Full Time Equivalent) in building design. Emphasis it's role in the sizing of building services. Illustrate with an example.	1	2	7
	b)	What are the different types of lifts? Draw and explain the components of a lift system in a modern commercial building.	1	2	7
UNIT-II					
3.	a)	List and explain the causes of fire accidents in modern high rise buildings. What are the design measures taken to detect fires and fight them in the building?	2	2	7
	b)	Draw and explain the various fire safety related symbols found on fire extinguishers, fire hydrants, fire safety systems. Why are fire fighting systems primed by a separate diesel engine located outside the building and open to sky?	2	3	7
OR					
4.	a)	What are the building design features and functional systems that aid in external intervention from a fire squad for quick control of a fire accident. Discuss the importance of regular fire safety audit for the same.	2	2	7
	b)	Narrate a typical first response from the occupants of a building in case of a fire accident and all the steps leading to safe exit and full control over the incident by competent disaster management team.	2	2	7

UNIT-III					
5.	a)	Discuss the significance of designing a centralised hot water system in a hotel building. How is the plumbing system designed from a safety and energy savings point of view?	3	2	7
	b)	Draw the outline of a one pipe system for collection and conveyance of wastewater in a 4 storey building. Explain how used water from different rooms is conveyed out of the building.	3	2	7
OR					
6.	a)	Draw and explain the functions of various plumbing and sanitary fixtures used inside a 3 BHK residential building.	3	2	7
	b)	Draw the outline of a two pipe system for collection and conveyance of wastewater in a 4 storey building. Explain how used water from different rooms is conveyed out of the building.	3	2	7
UNIT-IV					
7.	a)	Discuss the importance of day lighting in indoor spaces for occupant health and energy efficiency. What design measures can avoid glare and heat gains inside a living space without cutting out day lighting?	4	2	7
	b)	What is lighting power density? What are dimmable lights? How can they help in achieving visual comfort and energy savings?	4	2	7
OR					
8.	a)	Discuss the concepts of lumen and lux used in selecting luminaires. Cite a few examples of lux levels on working surfaces recommended in the National Building Code of India.	4	2	7
	b)	Explain the concept of cooling degree / Heating degree days. Illustrate its use in the design of Mechanical Ventilation and Air Conditioning systems in a building.	4	2	7
UNIT-V					
9.	a)	Distinguish between Rainwater Recharge and Rainwater Harvesting. What strategy do you recommend for Bhimavaram? How do you size RWH system in a building?	5	2	7
	b)	Explain the construction and working of a flat plate type Solar Water Heater. Size a system for a family of four living in a coastal climate like Bhimavaram.	5	2	7
OR					
10.	a)	What are green roofs? What is their role in resource conservation in a building? How can they help prevent urban flooding?	5	2	7
	b)	Explain the construction and working of an evacuated tube type Solar Water Heater. Size a system for a family of four living in a dry climate like Hyderabad.	5	2	7

CO-COURSE OUTCOME

KL-KNOWLEDGE LEVEL

M-MARKS

NOTE : Questions can be given as A,B splits or as a single Question for 14 marks

III B.Tech. II Semester MODEL QUESTION PAPER

BUSINESS STRATEGY (Open Elective-II)

(For CE, ECE, EEE & ME)

Time: 3 Hrs.

Max. Marks: 70 M

Answer ONE Question from EACH UNIT

All questions carry equal marks

Assume suitable data if necessary

			CO	KL	M
		UNIT-I			
1.		Define Strategic Management. List out the Henry Mintzberg's Schools of thought in strategic management?	1	2	14
		OR			
2.	a).	What is Vision Statement and write the components of Strategic Management Objective?	1	2	7
	b).	Explain about Fit Concept in strategic Management and briefly explain the strategy content.	1	2	7
		UNIT-II			
3.		Write about Sustainable competitive advantage. Explain the different sources of Sustained competitive advantage.	2	2	14
		OR			
4.		Does core competences can be the root of competitive advantage? Explain in detail.	2	2	14
		UNIT-III			
5.		Describe the competitive strategy in external environment of a firm and explain the five forces of industry attractiveness that shape the strategy.	3	2	14
		OR			
6.	a).	Mention the phases in Industry Life Cycle and its influence of each phase in a business.	3	2	8
	b).	What is the main goal of Value Chain and Discuss the Generic Strategies?	3	2	6
		UNIT-IV			
7.		Why do businesses opt for Diversification? Compare related and unrelated diversifications.	4	2	14
		OR			
8.		What is meant by Strategic Alliance? Differentiate Joint Ventures, Mergers and Acquisitions with examples.	4	2	14
		UNIT-V			
9.		How does McKinsey's 7S Framework help organizations in strategy implementation?	5	2	14
		OR			
10.		Overview the highlights of Corporate Governance.	5	2	14

CO-COURSE OUTCOME

KL-KNOWLEDGE LEVEL

M-MARKS

NOTE : Questions can be given as A,B splits or as a single Question for 14 marks

Course Code: B20CSOE04					
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					R20
III B.Tech. II Semester MODEL QUESTION PAPER					
DATA BASE MANAGEMENT SYSTEMS (Open Elective-II)					
(For CE, ECE, EEE & ME)					
Time: 3 Hrs.			Max. Marks:70		
Answer ONE Question from EACH UNIT					
All questions carry equal marks					
Assume suitable data if necessary					
			CO	KL	M
UNIT-I					
1	a).	Compare Database Management Systems with File Processing Systems	1	2	8
	b).	Explain the roles of different database users	1	2	6
OR					
2	a).	Discuss the applications of Database Management Systems	2	2	6
	b).	Describe the structure of a Database Management System	2	2	8
UNIT-II					
3		Give syntax and apply the SQL commands for defining two example tables of your choice. Then insert data, update data in the tables	2	3	14
OR					
4		What are relational instances and schemas? How'd you use keys and schemas in relational model?	2	3	14
UNIT-III					
5	a).	Apply conceptual DB design and draw E-R diagram for the following situations by assuming appropriate Attributes i) A Part is supplied by many suppliers at different costs and a supplier supplies many parts ii) An employee works in at most one department and a department has many employees iii) A house has at least and at most one owner and owner has many houses iv) A muslim woman marries at most one man and a muslim man could marry many woman	3	3	8
	b).	Demonstrate set operations in SQL	2	3	6
OR					
6	a).	Demonstrate different types of joins in SQL	2	3	7
	b).	Illustrate basic features of ER model	3	3	7

UNIT-IV					
7	a).	Apply Loss-less join decomposition into BCNF for an example table	4	2	8
	b).	Apply dependency preserving decomposition into 3NF for an example table	4	2	6
OR					
8		Illustrate Normal forms from 1 NF to BCNF.	4	3	14
UNIT-V					
9		What are page tables and Transaction tables? Describe analysis, redo and undo steps of ARIES.	5	2	14
OR					
10		Explain 2PL and time stamp ordering protocols	5	2	14
CO-COURSE OUTCOME		KL-KNOWLEDGE LEVEL	M-MARKS		

NOTE : Questions can be given as A,B splits or as a single Question for 14 marks



III B.Tech. II Semester MODEL QUESTION PAPER

OBJECT ORIENTED PROGRAMMING THROUGH C++ (Open Elective-II)

(For CE, ECE, EEE & ME)

Time: 3 Hrs.

Max. Marks:70

Answer ONE Question from EACH UNIT

All questions carry equal marks

Assume suitable data if necessary

			CO	KL	M
UNIT-I					
1.	a)	Discuss the differences between C and C++	1	2	7
	b)	Explain about disadvantages of conventional programming.	1	2	7
OR					
2.	a)	Explain about key concepts of Object Oriented Programming.	1	2	8
	b)	Explain about advantages of OOPS.	1	2	6
UNIT-II					
3.	a)	Explain Classes, Objects and Member Functions.	2	3	6
	b)	Write a C++ program to overload area() and perimeter() function to calculate area of shapes like triangle, square, circle and rectangle.	2	3	8
OR					
4.	a)	How will you destroy the objects initialized by the constructor in the program?	2	3	5
	b)	Explain the use of different constructors (default, parameterized and copy constructors) with suitable examples.	2	3	9
UNIT-III					
5.	a)	Explain inheritance with the advantages and disadvantages.	3	3	8
	b)	Illustrate the visibility of base class members for the access specifiers: private, protected and public while creating the derived class and also explain the syntax for creating derived class.	3	3	6
OR					
6.	a)	Explain multilevel inheritance with an example?	3	3	7
	b)	Write C++ Program to overload + operator to add two matrices.	3	3	7
UNIT-IV					
7.	a)	Explain virtual classes and their need while building class hierarchy.	4	2	7
	b)	Explain the role of this pointer in C++ with a programming example.	4	2	7
OR					

8.	a)	How does polymorphism promote extensibility? Illustrate	4	2	6
	b)	With a program explain how late binding can be achieved in C++.	4	2	8
UNIT-V					
9.	a)	Explain Class Template and Function Template	5	2	8
	b)	Write a C++ program that illustrates exception handling with the help of keywords: try, throws and catch.	5	3	6
OR					
10.	a)	What are macros? How they differ from templates	5	2	7
	b)	Write a C++ program for Generic Bubble Sort using Template Functions.	5	3	7

CO-COURSE OUTCOME

KL-KNOWLEDGE LEVEL

M-MARKS

NOTE : Questions can be given as A,B splits or as a single Question for 14 marks



III B.Tech. II Semester MODEL QUESTION PAPER

PROBLEM SOLVING USING PYTHON (Open Elective-II)

(For CE)

Time: 3 Hrs.

Max. Marks:70

Answer ONE Question from EACH UNIT

All questions carry equal marks

Assume suitable data if necessary

			CO	KL	M
		UNIT-I			
1	a)	Explain the basic data types available in Python with examples.	1	2	6
	b)	List and explain all the operators available in python	1	2	8
		OR			
2	a)	Illustrate the different types of control flow statements in Python	1	2	8
	b)	Write a program to display the Fibonacci sequence up to nth term where n is provided by the user.	1	2	6
		UNIT-II			
3	a)	Write Python program to count the total number of vowels, consonants and blanks in a String.	2	2	6
	b)	Compare mutable and Immutable data types in Python with suitable examples.	2	2	8
		OR			
4	a)	Explain List operations available in python.	2	2	8
	b)	Write a program to Display both the keys and values sorted in alphabetical order by the key.	2	2	6
		UNIT-III			
5	a)	Explain the concept of accessibility of variables in nested functions.	3	3	8
	b)	Define a function that calculates the sum of all numbers from 0 to its argument.	3	3	6
		OR			
6	a)	What are modules, how do you use them in your programs.	3	3	6
	b)	Write a short note on i) Keyword Arguments ii) Lambda Functions.	3	3	8
		UNIT-IV			
7	a)	Discuss the following methods associated with the file object a) read() b) readline() c) readlines() d) tell() e) seek() f) write().	4	2	8

	b)	Write Python Program to Count the Number of Words in a given file.	4	2	6
		OR			
8	a)	Explain the concept of class methods and static methods with examples.	4	2	6
	b)	Write Python Program to Demonstrate Multiple Inheritance with Method Overriding.	4	2	8
		UNIT-V			
9	a)	What is the difference between else block and finally block in exception handling? Explain with an example program.	5	2	7
	b)	Discuss in detail about Scrolling list boxes.	5	3	7
		OR			
10	a)	Explain in detail about User defined exceptions	5	2	7
	b)	Explain about command buttons and responding to events	5	3	7

CO-COURSE OUTCOME

KL-KNOWLEDGE LEVEL

M-MARKS

NOTE : Questions can be given as A,B splits or as a single Question for 14 marks



III B.Tech. II Semester MODEL QUESTION PAPER

PRINCIPLES OF COMMUNICATIONS (Open Elective-II)

(For AIDS, CE, CSBS, CSE, EEE, IT & ME)

Time: 3 Hrs.

Max. Marks:70

Answer ONE Question from EACH UNIT

All questions carry equal marks

Assume suitable data if necessary

			CO	KL	M
UNIT-I					
1	a)	Explain the operation of envelope detector with a neat diagram.	1	2	7
	b)	Derive an expression for output signal -to-noise ratio in DSB-SC system.	1	3	7
OR					
2	a)	Explain the coherent detection of DSB-SC modulated waves.	1	2	7
	b)	Explain vestigial sideband modulation.	1	2	7
UNIT-II					
3	a)	Define frequency deviation and phase deviation in Frequency Modulation and differentiate between NBFM and WBFM.	2	2	7
	b)	Explain transmission bandwidth of FM Signals	2	2	7
OR					
4	a)	Draw the block diagram of an Indirect method of FM generation and explain its operation.	2	2	7
	b)	Explain Pre-Emphasis and De-Emphasis.	2	2	7
UNIT-III					
5	a)	State and prove Nyquist Sampling theorem for low pass signals.	3	3	7
	b)	With neat block schematic diagrams explain the generation and detection of a PAM signal.	3	2	7
OR					
6	a)	Explain the modulation and demodulation techniques for pulse time modulation systems.	3	2	7
	b)	Explain Time Division Multiplexing.	3	2	7
UNIT-IV					
7	a)	Explain about the operation of a PCM system.	4	2	7
	b)	Explain differential pulse code modulation.	4	2	7
OR					

8	a)	Explain delta modulation (DM) system.	4	2	7
	b)	Explain companding.	4	2	7
UNIT-V					
9	a)	Explain how a binary signal can be transmitted and received by using a BPSK system.	5	2	7
	b)	Explain the method of generation and recovery of a DPSK signal. What is DEPSK?	5	2	7
OR					
10	a)	Explain how a binary signal can be transmitted and received by using a BFSK system.	5	2	7
	b)	Explain the role of a QPSK transmitter and receiver in serial data transmission and reception.	5	2	7

CO-COURSE OUTCOME

KL-KNOWLEDGE LEVEL

M-MARKS

NOTE : Questions can be given as A,B splits or as a single Question for 14 marks



Course Code: B20ECOE04					
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					R20
III B.Tech. II Semester MODEL QUESTION PAPER					
IC APPLICATIONS (Open Elective-II)					
(For AIDS, CE, CSBS, CSE, EEE, IT & ME)					
Time:3Hrs.			Max.Marks:70		
Answer ONE Question from EACH UNIT					
All questions carry equal marks					
Assume suitable data if necessary					
			CO	KL	M
UNIT-I					
1	a)	Draw a block diagram of typical OP-AMP and explain the function of each block.	1	3	7
	b)	Explain the Integrator circuit with neat circuit diagram and waveforms	1	3	7
OR					
2	a)	Discuss the ideal characteristics of op-amp	1	3	7
	b)	Explain the operation of a Regenerative comparator with circuit diagram and Waveforms.	1	3	7
UNIT-II					
3	a)	Derive the transfer function of a second order LPF. Comment on its frequency response.	2	3	7
	b)	Explain about voltage to current converters	2	2	7
OR					
4	a)	Explain the operation of Quadrature oscillator and derive an expression for frequency of oscillations	2	3	7
	b)	Explain the operation of wein bridge oscillator and derive an expression for frequency of oscillations	2	3	7
UNIT-III					
5	a)	Draw the circuit of Schmitt trigger using IC555 timer and explain its operation?	3	3	7
	b)	Design a monostable multivibrator using 555 timer to produce a pulse width of 100 ms and explain its working with the help of a functional diagram of a 555 timer.	3	3	7
OR					
6	a)	With the help of schematic diagram of 555 timer, explain how it can be used as mono stable multi vibrator	3	3	7
	b)	Draw and explain the working of 555-timer circuit in a stable mode to get output waveform with 50% duty cycle	3	3	7

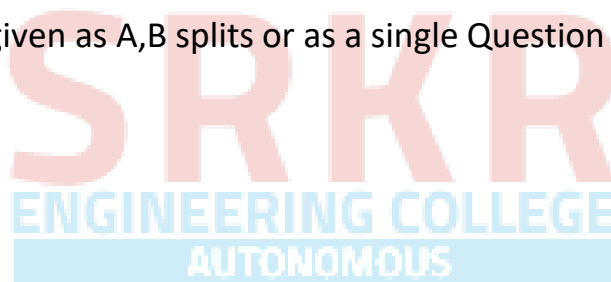
UNIT-IV					
7	a)	With a neat diagram explain the working principle of R-2R ladder type DAC.	4	3	7
	b)	With neat block diagram, explain successive approximation type A/D converter in detail	4	3	7
OR					
8	a)	Which is the fastest ADC? Explain the operation and discuss its merits and de-merits	4	3	7
	b)	Explain the operation of counter type ADC with neat diagram.	4	3	7
UNIT-V					
9	a)	Explain CMOS AND-OR-INVERT logic with an example	5	3	7
	b)	Explain CMOS OR-AND-INVERT logic with an example	5	3	7
OR					
10	a)	Explain CMOS NAND Gate	5	3	7
	b)	Explain CMOS NAND Gate	5	3	7

CO-COURSE OUTCOME

KL-KNOWLEDGE LEVEL

M-MARKS

NOTE : Questions can be given as A,B splits or as a single Question for 14 marks



Course Code: B20EEOE03					
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					R20
III B.Tech. II Semester MODEL QUESTION PAPER					
FUNDAMENTALS OF ELECTRIC VEHICLES (Open Elective-II)					
(For AIDS, CSBS, ECE, IT & ME)					
Time: 3 Hrs.			Max. Marks: 70 M		
Answer ONE Question from EACH UNIT					
All questions carry equal marks					
Assume suitable data if necessary					
			CO	KL	M
UNIT-I					
1.	a).	Explain in detail evolution of EVs.	1	3	7
	b).	Describe Vehicle dynamics with fixed tractive effort	1	3	7
OR					
2.	a).	Illustrate EV with IC Engine Vehicle.	1	3	7
	b).	Describe about the Electrical Quantities used in EVs.	1	3	7
UNIT-II					
3.	a).	Discuss Various configurations of EVs in detail.	2	3	7
	b).	Describe the operation of Fuel cell based EV.	2	3	7
OR					
4.	a).	Discuss in detail about power train components.	2	3	7
	b).	Explain the operation of parallel HEV	2	3	7
UNIT-III					
5.	a).	Explore the importance of lead acid battery, explain its operation.	3	3	7
	b).	Explain in Detail Battery Management System in EVs	3	3	7
OR					
6.	a).	Explain the various battery performance parameters.	3	3	7
	b).	Illustrate the various Li ion batteries and explain their operation and how safety is important in handling the lithium-ion batteries.	3	3	7
UNIT-IV					
7.		Explain in detail the working and operation of PMSM drive in EV with block diagrams.	4	3	14
OR					
8.	a).	Explain the working schematic of BLDC drives with respect to EV	4	3	7
	b).	Explain the working of Electric Drive Components of EV.	4	3	7

UNIT-V					
CO-COURSE OUTCOME	KL-KNOWLEDGE LEVEL	M-MARKS			
9.	a).	Explain the EV charging system with block diagram.	5	3	7
	b).	Illustrate various charging functions.	5	3	7
OR					
10.		Explain V2G and G2V technologies with block diagram.	5	3	14

NOTE : Questions can be given as A,B splits or as a single Question for 14 marks



Course Code: B20EEOE04					
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					R20
III B.Tech. II Semester MODEL QUESTION PAPER					
RENEWABLE ENERGY SOURCES (Open Elective-II)					
(For AIDS, CSBS, ECE & IT)					
Time: 3 Hrs.			Max. Marks: 70 M		
Answer ONE Question from EACH UNIT					
All questions carry equal marks					
Assume suitable data if necessary					
			CO	KL	M
UNIT-I					
1.	a).	What are the Effects of Conventional Energy methods?	1	3	7
	b).	Classify renewable energy sources? Explain in brief the need of these energy sources.	1	3	7
OR					
2.	a).	What are the Environmental aspects of conventional power plants.	1	3	7
	b).	What is meant by Renewable energy sources? Explain in brief this energy source scenario in Indian context.	1	3	7
UNIT-II					
3.	a).	Explain the principle of conversion of solar energy into heat.	2	3	7
	b).	Explain the I-V Characteristics of solar cell.	2	3	7
OR					
4.	a).	Explain in detail about the beam and Diffuse Solar radiation	2	3	7
	b).	What is the principle of solar photo voltaic power generation? What are the main elements of a PV system?	2	3	7
UNIT-III					
5.	a).	Describe with a neat sketch the working of a wind energy system with main Components.	3	3	7
	b).	What are the different types of wind energy systems?	3	3	7
OR					
6.	a).	What are the Safety and Environmental Aspects of wind energy?	3	3	7
	b).	Describe the main applications of wind energy, giving neat sketches.	3	3	7
UNIT-IV					
7.	a).	List the advantages and disadvantages of tidal power.	4	3	7
	b).	Explain the following terms: i) Tidal movement ii) tidal current iii) Spring tide and iv) Neap tide.	4	3	7
OR					
8.	a).	Write a short note on wave energy conversion machines. What are the	4	3	7

		advantages and limitations of wave energy conversion?			
	b).	Identify the environmental impacts of geothermal energy.	5	3	7
		UNIT-V			
9.	a).	Making use of diagram explain the vapour dominated and Liquid dominated systems.	5	3	7
	b).	Define a geothermal source. What are the classifications of geothermal source	5	3	7
		OR			
10.	a).	What is a fuel cell? Describe the principle of working of a fuel cell with reference to H ₂ -O ₂ cell.	5	3	7
	b).	Describe the classification of fuel cell. With a neat sketch explain the working of fuel cell	5	3	7

CO-COURSE OUTCOME

KL-KNOWLEDGE LEVEL

M-MARKS

NOTE : Questions can be given as A,B splits or as a single Question for 14 marks



III B.Tech. II Semester MODEL QUESTION PAPER

ARTIFICIAL INTELLIGENCE TOOLS & TECHNIQUES (Open Elective-II)

(For CE, ECE, EEE & ME)

Time: 3 Hrs

Max. Marks: 70

Answer ONE Question from EACH UNIT

All questions carry equal marks

Assume suitable data if necessary

			CO	KL	M
UNIT-I					
1	a)	What are the applications of Artificial Intelligence?	1	3	7
	b)	Explain Foundations of Artificial Intelligence?	1	3	7
OR					
2	a)	Elaborate the implementation of Tic-Tac-Toe game with 3 approaches.	1	3	7
	b)	Categorize intelligent systems based on their working principle.	1	3	7
UNIT-II					
3	a)	Illustrate in detail about the constraint satisfaction procedure with example?	2	3	7
	b)	Elaborate the working of A* Algorithm with an example.	2	3	7
OR					
4	a)	Describe alpha beta pruning procedure with an example.	2	3	7
	b)	Discuss the implementation of all the exhaustive searches with examples.	2	3	7
UNIT-III					
5	a)	Trace the Resolution Algorithm by taking an example.	3	3	7
	b)	Discuss the procedure of converting WFF to the clause form.	3	3	7
OR					
6	a)	Explain Semantic Tableau system along with rules and example.	3	3	7
	b)	Differentiate propositional & predicate logic	3	3	7
UNIT-IV					
7	a)	Discuss the procedure to represent knowledge using Semantic Network.	4	3	7
	b)	How do you represent visiting a restaurant in the form of a Script? Explain	4	3	7
OR					
8	a)	Discuss the procedure to represent knowledge using Semantic Network.	4	3	7
	b)	Write about Conceptual Dependency theory. How it will be used for Knowledge Representation?	4	3	7

		UNIT-V			
9	a)	Differentiate Expert Systems versus Traditional Systems.	5	3	7
	b)	Write the significance of Bayes's theorem in AI	5	3	7
		OR			
10	a)	Explain Dempster-Shafer Theory	5	3	7
	b)	Explain the significance of various Fuzzy Set Operations.	5	3	7
		CO-COURSE OUTCOME	KL-KNOWLEDGE LEVEL	M-MARKS	

NOTE : Questions can be given as A,B splits or as a single Question for 14 marks



Course Code: B20ITOE04					
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					R20
III B.Tech. II Semester MODEL QUESTION PAPER					
FUNDAMENTALS OF DATA SCIENCE (OE-II)					
(For CE, ECE, EEE & ME)					
Time: 3 Hrs.			Max. Marks: 70 M		
Answer ONE Question from EACH UNIT					
All questions carry equal marks					
Assume suitable data if necessary					
			CO	KL	M
UNIT-I					
1.	a).	Explain Linear algebra with Numpy?	1	2	7
	b).	Explain Required steps of data science?	1	2	7
OR					
2.	a).	Explain data types in data science?	1	2	7
	b).	Explain file input and output with arrays?	1	2	7
UNIT-II					
3.	a).	How many types of files in data science? Explain each with examples.	2	2	7
	b).	Apply Correlation and Covariance with examples using sample data?	2	3	7
OR					
4.	a).	Explain Data loading, Storage using pandas?	2	2	7
	b).	Make a pandas Data Frame with two-dimensional list using python?	2	3	7
UNIT-III					
5.	a).	Explain string object methods?	3	2	7
	b).	Explain about Data Wrangling and uses of data Wrangling?	3	2	7
OR					
6.	a).	What is data Cleaning and preparation? Explain different types of data cleaning techniques with examples.	3	2	7
	b).	Describe the methods join, Combine and reshape - Hierarchical indexing using student sample data?	3	2	7
UNIT-IV					
7.	a).	Define Data Visualization what are the benefits of data visualization?	4	2	7
	b).	Explain Data aggregation and Group operations Group By mechanics?	4	2	7
OR					
8.	a).	What are various python visualization tools? Explain any two.	4	2	7
	b).	How can we visualize two dimensions of data in a single chart?	4	2	7

UNIT-V					
9.	a).	Explain types of time series tools?	5	2	7
	b).	Make a Upsampling with examples using student data?	5	3	7
OR					
10.	a).	Explain methods of date range, Frequencies?	5	2	7
	b).	Apply Resampling and conversions with examples?	5	3	7

CO-COURSE OUTCOME

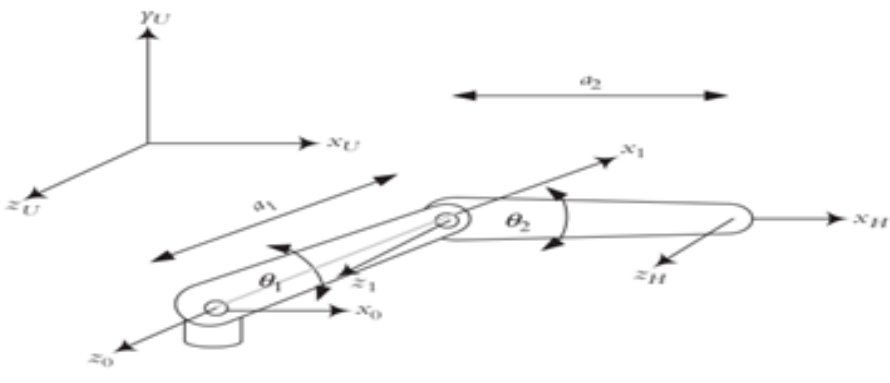
KL-KNOWLEDGE LEVEL

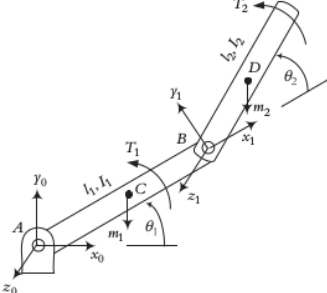
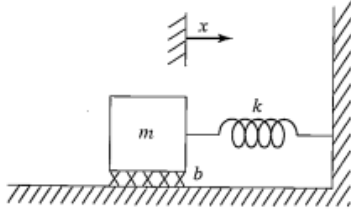
M-MARKS

NOTE : Questions can be given as A,B splits or as a single Question for 14 marks



Course Code: B20MEOE04					
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			R20		
III B.Tech. II Semester MODEL QUESTION PAPER					
INTRODUCTION TO ROBOTICS (Open Elective-II)					
(For AIDS, CE, CSBS, CSE, ECE, EEE & IT)					
Time: 3 Hrs.		Max. Marks: 70 M			
Answer ONE Question from EACH UNIT					
All questions carry equal marks					
Assume suitable data if necessary					
			CO	KL	M
UNIT – I					
1.	a).	Explain various components of robot.	1	2	7
	b).	Discuss applications of robot in brief.	1	2	7
OR					
2.	a).	Explain working principle of encoders.	1	2	7
	b).	Classify and compare various types of actuation systems.	1	2	7
UNIT – II					
3.	a).	Determine the new location of point P(1, 2, 3)T relative to the reference frame after a rotation of 30° about the z-axis followed by a rotation of 60° about the y-axis.	2	3	7
	b).	A frame B is rotated 90° about the z-axis, then translated 3 and 5 units relative to the n- and o-axes respectively, then rotated another 90° about the n-axis, and finally, 90° about the y-axis. Calculate the new location and orientation of the frame. $B = \begin{bmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 0 & -1 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix}$	2	3	7
OR					
4.	a).	Suppose that a robot is made of a Cartesian and <i>RPY</i> combination of joints. Find the necessary <i>RPY</i> angles to achieve the following: $T = \begin{bmatrix} 0.527 & -0.574 & 0.628 & 4 \\ 0.369 & 0.819 & 0.439 & 6 \\ -0.766 & 0 & 0.643 & 9 \\ 0 & 0 & 0 & 1 \end{bmatrix}$	2	3	7
	b).	Also, solve for the Euler angles for the above matrix	2	3	7
UNIT – III					
5.	a).	Explain the concept of DH notation with a general case of a robot joint.	3	2	8

	<p>b). Obtain the DH parameters and derive the forward kinematics equation for a RR robot shown below.</p> 	3	3	6
	OR			
6.	<p>a). In the 2-DOF robot, the transformation matrix 0T_H is given in symbolic form, as well as in numerical form for a specific location. The length of each link l_1 and l_2 is 1 unit. Solve the values of θ_1 and θ_2 for the given location.</p> ${}^0T_H = \begin{bmatrix} C_{12} & -S_{12} & 0 & l_2 C_{12} + l_1 C_1 \\ S_{12} & C_{12} & 0 & l_2 S_{12} + l_1 S_1 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} -0.2924 & -0.9563 & 0 & 0.6978 \\ 0.9563 & -0.2924 & 0 & 0.8172 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$	3	3	7
	<p>b). Suppose the location and orientation of a hand frame is expressed by the following matrix. What is the effect of a differential rotation of 0.15 radians about the z-axis, followed by a differential translation of [0.1, 0.1, 0.3]? Find the new location of the hand.</p> ${}^R T_H = \begin{bmatrix} 0 & 0 & 1 & 2 \\ 1 & 0 & 0 & 7 \\ 0 & 1 & 0 & 5 \\ 0 & 0 & 0 & 1 \end{bmatrix}$	3	3	7
	UNIT – IV			
7.	<p>Joint 1 of the 6-axis robot is to go from initial angle of $\theta_i = 30^\circ$ to the final angle of $\theta_f = 75^\circ$ in 5 seconds with a cruising velocity of $\omega_1 = 10^\circ/\text{sec}$. Find the necessary time for blending and plot the joint positions, velocities, and accelerations.</p>	4	3	14
	OR			
8.	<p>Using the Lagrangian method, derive the equations of motion for the 2-DOF robot arm, as shown in Figure below. The center of mass for each link is at the center of the link. The moments of inertia are I_1 and I_2.</p>	4	3	14

					
		UNIT – V			
9.	a).	<p>Determine the motion of the system shown below if the parameter values are $m = 1$, $b = 5$, and $k = 6$ and the block is released from rest from a position $x = -1$.</p> 	5	3	7
	b).	Explain the concept of control law partitioning with the help of block diagram	5	2	7
		OR			
10	a).	Analyze the stability of a linear spring mass damper system using Lyapunov method	1	3	7
	b).	Develop the block diagram for model based control for nonlinear control of manipulator	1	3	7

CO-COURSE OUTCOME

KL-KNOWLEDGE LEVEL

M-MARKS

NOTE : Questions can be given as A,B splits or as a single Question for 14 marks

Course Code: B20MEOE05					
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					R20
III B.Tech. II Semester MODEL QUESTION PAPER					
OPERATIONS MANAGEMENT (Open Elective-II)					
(For AIDS, CE, CSBS, CSE, ECE, EEE & IT)					
Time: 3 Hrs.			Max. Marks: 70 M		
Answer ONE Question from EACH UNIT					
All questions carry equal marks					
Assume suitable data if necessary					
			CO	KL	M
UNIT-I					
1.	a).	Define Operations Management. Name three underlying reasons why operations managers must forecast.	1	2	7
	b).	Describe the factors affecting Operations Management today.	1	2	7
OR					
2.	a).	What is forecasting? Why the forecasting is essential in Operations Management?	1	2	7
	b).	Describe any three qualitative forecasting methods.	1	2	7
UNIT-II					
3.	a).	List the various factors influencing plant location.	2	2	7
	b).	Differentiate between rural and urban sites	2	2	7
OR					
4.	a).	What is facility layout? What are the objectives for a typical manufacturing operation layout?	2	2	7
	b).	What are the four basic types of layouts for manufacturing facilities and explain any two of them in detail.	2	2	7
UNIT-III					
5.	a).	What is aggregate planning? What are the goals of aggregate planning?	3	2	7
	b).	State the guidelines for aggregate planning.	3	2	7
OR					
6.	a).	What are the functions of Master Scheduling?	3	2	7
	b).	Illustrate the differences between Assembly industry scheduling and Process industry scheduling.	3	2	7
UNIT-IV					
7.	a).	Define Inventory. What is the need for inventories?	4	2	7
	b).	Describe JIT Inventory system.	4	2	7
OR					

8.		Explain in detail about ABC analysis using an example.	4	3	14
		UNIT-V			
9.	a).	Define MRP. What are the main inputs and outputs of MRP?	5	2	7
	b).	State the benefits and limitation of MRP.	5	2	7
		OR			
10.	a).	What is Just-in-Time Manufacturing philosophy?	5	2	7
	b).	Describe MRP II.	5	2	7

CO-COURSE OUTCOME

KL-KNOWLEDGE LEVEL

M-MARKS

NOTE : Questions can be given as A,B splits or as a single Question for 14 marks



Course Code: B20MEOE06					
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					R20
III B.Tech. II Semester MODEL QUESTION PAPER					
MICRO-ELECTROMECHANICAL SYSTEMS (Open Elective-II)					
(For AIDS, CE, CSBS, CSE, ECE, EEE & IT)					
Time: 3 Hrs.			Max. Marks: 70 M		
Answer ONE Question from EACH UNIT					
All questions carry equal marks					
Assume suitable data if necessary					
			CO	KL	M
UNIT-I					
1.	a).	Explain about structural and sacrificial materials.	1	3	7
	b).	Describe the MEMS gyroscopes.	1	3	7
OR					
2.	a).	Explain about surface micro machining and wafer bonding.	1	3	7
	b).	Describe about shear mode piezo actuator and gripping piezo actuator.	1	3	7
UNIT-II					
3.	a).	Explain about thermal flow sensors and micro hot plate gas sensors.	2	3	7
	b).	Write about thermistors and thermo devices in detail.	2	3	7
OR					
4.	a).	Describe U-shaped horizontal and vertical electro thermal actuator.	2	3	7
	b).	Illustrate shape memory alloys (SMA) and data storage cantilever in detail.	2	3	7
UNIT-III					
5.	a).	Explain the principle of MOEMS technology in detail.	3	3	7
	b).	Explain about digital micro mirror device (DMD).	3	3	7
OR					
6.	a).	Describe about micro lens and micro mirrors.	3	3	7
	b).	Explain about grating light valve (GLV).	3	3	7
UNIT-IV					
7.	a).	Explain magnetic materials for MEMS and properties.	3	3	7
	b).	Describe about magnetic probe based storage device.	3	3	7
OR					
8.	a).	Write about mag MEMS actuators and by directional micro actuator.	3	3	7
	b).	Describe about feedback circuit integrated magnetic actuator.	3	3	7

UNIT-V					
9.	a).	Explain about fluid actuation methods.	4	3	7
	b).	Explain about tuner/filter, resonator and clarification of tuner.	4	3	7
OR					
10.	a).	Describe micro fluid dispenser and micro pumps.	4	3	7
	b).	Describe about RF MEMS and MEMS inductors.	4	3	7

CO-COURSE OUTCOME

KL-KNOWLEDGE LEVEL

M-MARKS

NOTE : Questions can be given as A,B splits or as a single Question for 14 marks



Course Code: B20BSOE02									
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					R20				
III B.Tech. II Semester MODEL QUESTION PAPER									
COMPUTATIONAL STATISTICS with R (Open Elective-II)									
(For AIDS, CE, CSBS, CSE, ECE, EEE, ME & IT)									
Time: 3 Hrs.			Max. Marks: 70 M						
Answer ONE Question from EACH UNIT									
All questions carry equal marks									
Assume suitable data if necessary									
			CO	KL	M				
UNIT-I									
1.	a).	Describe how to install R package and explain arithmetic operations in R	1	3	7				
	b).	Write an R program to add, delete and update last element in the list and display the results before and after operation.	1	3	7				
OR									
2.	a).	How to take input as vectors in R and write R programming for vector addition and multiplication taking suitable example.	1	3	7				
	b).	Describe how to create a data frame using R Programming with suitable data	1	3	7				
UNIT-II									
3.		Explain the syntax for Binomial, Poisson and Hyper Geometric distributions in R programming	2	3	14				
OR									
4.		Explain syntax for the Normal, Exponential and Gamma distributions in R programming	2	3	14				
UNIT-III									
5.	a).	Find MLE of the parameter 'μ' of Normal distribution	3	3	7				
	b).	Explain criteria of good estimation. If x_1, x_2, \dots, x_n is a random sample from a normal population $N(\mu, 1)$. Show that $t = \frac{1}{n} \sum_{i=1}^n x_i^2$ is an unbiased estimator of $\mu^2 + 1$.	3	3	7				
OR									
6.		Write R functions for applying t-test, F-test and Chi-square tests.	4	3	14				
UNIT-IV									
7.		Fabric				5	3	14	
		Treatment	1	2	3				4
		1	17.6	19.6	18.4				19.8
		2	19.2	20.4	19.8				20.7
3	17.2	19.0	17.1	17.3					

		4	17.0	20.1	17.1	17.7				
		5	17.4	18.8	17.8	16.5				
		Perform ANOVA to test whether there is any significant difference between treatments and fabrics.								
		OR								
8.		Describe ANOVA and how to apply R programming to perform ANOVA						5	3	14
		UNIT-V								
9.	a).	A coin is tossed 20 times and the following sequence of heads (H) and Tails (T) is obtained. H T T H H T T H T H H H T T H H T H H H Use Run test to determine at 5% level of significance if the coin is unbiased.						6	3	7
	b).	What are Non Parametric tests? What are the advantages of Non Parametric tests?						6	2	7
		OR								
10.	a).	Test whether the following samples have been drawn from the same population or not by using Mann-Whitney Wilcoxon U-test						6	3	7
		Sample I	7	5	12	20	4	32	46	
		Sample II	3	6	35	17	24	40	50	
	b).	Construct R program on Spearman's and Kendall's test						6	3	7

CO-COURSE OUTCOME

KL-KNOWLEDGE LEVEL

M-MARKS

Estd. 1980

ENGINEERING COLLEGE
AUTONOMOUS

NOTE : Questions can be given as A,B splits or as a single Question for 14 marks